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EXAMINER

DONG, DALEI

ART UNIT PAPER NUMBER

2875

DATE MAILED: 03/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/744,382

Applicant(s)

KADO ET AL

Examiner

Dalei Dong

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2,28 and 30-78 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2,28,30 and 76-78 is/are allowed.
- 6) ☒ Claim(s) 31-75 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/744,382.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 31-44 and 55-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,846,110 to Kanagu in view of U.S. Patent No. 6,109,994 to Cho.

Regarding to claims 31-39, 55, 57-64, Kanagu discloses in Figures 5 and 6, a method of manufacturing a plasma display panel comprising “ a front panel 10, shown in Figure 6, supported by a glass substrate 11 as a support body is first made in a front panel process P10 (FIG. 5), and a back panel 20 supported by a glass substrate 21 as a support body is manufactured concurrently in a back panel process P20 (FIG. 5)” (column 8, line 4-9).

Kanagu also discloses in Figures 5 and 6, “next, in a sealing process P30 (FIG. 5) the pair of front panel 10 and back panel 10 is arranged to oppose each other (P31), so that the panel envelope is formed in a sealing process P32 as described below, at which the peripheral (frame) area of both the panels are sealed with each other” (column 8, line 10-14).

Kanagu further discloses in Figures 5 and 6, the “PDP 1 is completed after sequential passing an exhaust process (P41) at which an internal impurity gas is

exhausted with a vacuum pump, and a process P42 at which a discharge gas, a mixture of neon, and a small amount of xenon is filled therein. Pressure of the discharge gas is about 500 Torr” (column 8, line 15-19).

Kanagu further yet discloses in Figures 5 and 6, “on completion of filling the discharge gas, discharge spaces 30 are completely sealed up by tipping off exhaust tube 60; as well as PDP 1 is separated from the external piping system” (column 8, line 20-24).

However, Kanagu does not disclose the shape of the sealant layer is set so as to provide at least one gap between the peripheral regions of the front panel and the back panel when the front panel and the back panel are placed facing each other. Cho teaches “the sealing of outer wall 44 to faceplate structure 42 can be done in a number of ways after the alignment is complete. Normally, the sealing of wall 44 to structure 42 is performed under non-vacuum conditions at a pressure close to room pressure, typically in an environment of dry nitrogen (*dry circulating gas*) or an inert gas such as argon” (column 9, lines 21-26).

Cho also teaches “the faceplate-structure-to-outer-wall seal can be effected in a sealing oven by raising faceplate structure 42 and outer wall 44 to a suitable sealing temperature to produce the seal and then cooling the structure down to room temperature. The temperature ramp-up and ramp-down during the global heating operation in the sealing oven each typically take 3 hr. The faceplate-structure-to-outer-wall sealing temperature, typically in the vicinity of 400-550.degree. C., equals or slightly exceeds the melting temperature of the frit in outer wall 44, and therefore causes the frit to be in a

molten state for a brief period of time. The faceplate-structure-to-outer-wall sealing temperature is sufficiently low to avoid melting, or otherwise damaging, any part of faceplate structure 42” (column 9, lines 27-40).

Cho further teaches, “regardless of how spacer walls 46 are secured to baseplate structure 40, spacer walls 46 are sufficiently taller than outer wall 44 that a gap 48 extends between aligned sealing areas 44S and 40S. At this stage of the sealing process, gap 48 normally extends along the entire (rectangular) length of sealing areas 40S and 44S. At the minimum, gap 48 extends along at least 50% of the sealing area length. The average height of gap 48 is normally in the range of 25-100 .mu.m, typically 75 .mu.m. The average gap height can readily be at least as much as 300 .mu.m” (column 10, line 62 to column 11, line 4).

Cho further yet teaches in Figures 6 and 7, “venting slots can be provided along edge sealing area 44s of outer wall 44 to facilitate removal of contaminant gases during the hermetic sealing operation performed in a vacuum chamber 54 or 74 in any of the processes of Figures 2, 4 and 5. Figure 6 illustrates how a cross section of composite structure 42/44/46 appears when venting slots 90 are provided along wall-edge sealing area 44s. Figure 7 presents a perspective view of structure 42/44/46 with venting slot 90” (column 24, line 5-12).

Cho furthermore teaches “in the example of FIGS. 6 and 7, one venting slot 90 is provided in each of the four sub-walls that form outer wall 44. Each venting slot 90 in the illustrated example typically extends for at least 50% of the length of the sub-wall in which that slot 90 is formed. Other arrangements of venting slots 90 can be employed.

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For example, two or more of slots 90 can be created in one or more of the sub-walls of outer wall 44" (column 24, line 13-20)

Cho further yet teaches in Figures 6 and 7, "venting slots 90 can be formed by physically removing portions of outer wall 44 at the slot locations. When the sub-walls of wall 44 are created by firing frit that is in a "green" plastic (soft) state due to the presence of binding material in the frit, slots 90 are preferably formed in the sub-walls by appropriately pressing down on the green frit at the locations for vents 90 until they are formed after which the so-slotted frit is fired. Alternatively, when the sub-walls of wall 44 are in a hard (e.g., fired) state, slots 90 can be created by heating the sub-walls to a temperature sufficient to soften them and then appropriately pressing down on the sub-walls at the location for vents 90" (column 24, line 21-32).

Cho finally teaches "due to the presence of venting slots 90, the height of gap 48 varies from a (non-zero) minimum value to a maximum value rather than being largely uniform as indicated in FIGS. 2b, 4c, and 5b. The difference between the minimum and maximum values of the gap height is the depth of slots 90. The venting slot depth is chosen carefully so as to avoid having the maximum gap height exceed the maximum height, typically at least 300 .mu.m, that can be jumped by the material of outer wall 44. A venting slot depth of 50 .mu.m or more, typically 75 .mu.m, can readily be accommodated when the maximum gap height is in the vicinity of 125 .mu.m" (column 24, lines 43-53).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have apply the venting slots of Cho to the sealant layer of plasma

display panel of Kanagu in order to facilitate removal of contaminant gases during the hermetic sealing portion and thus increase the luminous intensity and prolong the lifetime of the plasma display panel.

Regarding to claims 40 and 65, Kanague discloses in Figure 5, "baking of the sealant material to de-gas therefrom in process P26 greatly decreases the impurities, such as organic solvents, which may emanate in the following sealing process P30 causing pollution of discharge space 30" (column 8, line 49-52). Kanague discloses the claimed invention except for the temperature range of 250°C to the softening point of the sealant layer. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the temperature range between 250°C to the softening point of the sealant layer, since it has been held that where the general condition of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding to claims 41-44 and 66-69, Kanagu discloses a method of manufacturing a plasma display panel comprising forming a phosphor layer on at least one of a main surface of a front panel facing a back panel and a main surface of the back panel facing the front panel and forming a sealant layer on a peripheral region of the main surface of the front panel facing the back panel.

However, Kanagu does not disclose the shape of the sealant layer is set so as to provide at least one gap between the peripheral regions of the front panel and the back

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panel and the sealing step is performed in a non-vacuum atmosphere. Cho teaches the shape of the sealant layer is set as to provide at least one gap between the peripheral regions of the front panel and the back panel and “using a suitable alignment system (not shown), structures 40 and 42/44/46 are positioned relative to each other in the manner shown in FIG. 2b. This entails aligning sealing areas 40S and 44S (vertically in FIG. 2b) and bringing the interior surface of baseplate structure 40 into contact with the remote (upper in FIG. 2b) edges of spacer walls 46. The alignment is done optically in a non-vacuum environment, normally at room pressure, with alignment marks provided on plate structures 40 and 42. Specifically, baseplate structure 40 is optically aligned to faceplate structure 42, thereby causing baseplate sealing area 40S to be aligned to upper wall edge 44S” (column 10, line 40-51).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have apply the venting sealant layer of Cho for the plasma display panel of Kanagu and further seal the plasma display panel of Kanagu in a non-vacuum environment of Cho in order to facilitate removal of contaminant gases and readily and effectively hermetic sealing the panels and thus increase the luminous intensity and prolong the lifetime of the plasma display panel and reduce the manufacturing cost.

Regarding to claim 56, Kanagu in view of Cho discloses the claimed invention except for the softening point of the sealant layer is in a range of 380 to 390 degree Celsius. The softening point of the sealant layer is merely an intrinsic property of the selected sealant material and thus it would have been obvious to one having ordinary skill



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in the art at the time the invention was made to have choose the sealant material in accordance to the design specification of the plasma display, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

3. Claims 45-53 and 70-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,846,110 to Kanagu in view of U.S. Patent No. 6,109,994 to Cho in further view of U.S. Patent No. 5,951,350 to Aoki.

Regarding to claims 18-26, Kanagu discloses a method of manufacturing a plasma display panel comprising forming a phosphor layer on at least one of a main surface of a front panel facing a back panel and a main surface of the back panel facing the front panel and forming a sealant layer on a peripheral region of the main surface of the front panel facing the back panel.

However, Kanagu does not disclose the shape of the sealant layer is set so as to provide at least one gap between the peripheral regions of the front panel and the back panel and the sealing step is performed in a non-vacuum atmosphere and a blue phosphor. Cho teaches the shape of the sealant layer is set as to provide at least one gap between the peripheral regions of the front panel and the back panel and sealing process of the front and back panel takes place in a non-vacuum environment.

However, Cho does not teach a blue phosphor. Aoki teaches “fluorescent substances generally used in PDPs can be used as the fluorescent substance grains

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contained in the fluorescent substance ink. The following are examples of such fluorescent substances:

blue fluorescent substance  $\text{BaMgAl}_{10}\text{O}_{17} : \text{Eu}^{2+}$

green fluorescent substance  $\text{BaAl}_{12}\text{O}_{19} : \text{Mn}$  or  $\text{Zn}_2\text{SiO}_4 : \text{Mn}$

red fluorescent substance  $(\text{Y}_x\text{Gd}_{1-x})\text{BO}_3 : \text{Eu}^{3+}$  or  $\text{YBO}_3 :$

$\text{Eu}^{3+}$ " (column 7, line 4-14). Aoki teaches the same blue phosphor layer

composition as the specified in the limitation, therefore it would be inherent for the same blue phosphor layer to exhibit the same intrinsic characteristics and properties as detailed in the limitations.

Aoki also teaches in Figure 3, an driving circuit for driving the electrodes of the plasma display panel.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have apply the venting sealant layer of Cho and the blue phosphor layer of Aoki for the plasma display panel of Kanagu and further seal the plasma display panel of Kanagu in a non-vacuum environment of Cho in order to facilitate removal of contaminant gases and readily and effectively hermetic sealing the panels and thus ease the manufacturing process and increase the luminous intensity and prolong the lifetime of the plasma display panel and reduce the manufacturing cost.

Regarding to claim 28 and 30, Kanagu in view of Cho in further view of Aoki disclosed the claimed invention except for the dry gas atmosphere is 130 Pa or lower. However, it is old and well known in the art to have seal the plasma display under low

pressure in order to prevent any impurities being sealed into the display device and thus shortens the lifetime of the display, further Applicant has not established the criticality of the pressure level to the claimed invention, and Applicant has not done testing or comparative analysis not obvious to one having ordinary skill in the art to demonstrate the advantage of the claimed pressure level, thus the proper pressure level can be determined by routine experimentation by one having ordinary skill in the art.

Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have adjust the pressure of the sealing environment in accordance to the design specification, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

4. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,236,159 to Inoue.

Regarding to claim 54, Inoue discloses, “vent pipes are fitted to the vent holes. The vent holes and the vent pipes allow the gas to flow in and out of the panel. For example, the vent holes may be formed in the sealing member between the substrates and fitted with the vent pipes so that the vent pipes project from the side faces of the panel. The formation of the vent holes can be achieved by a conventionally known method” (column 5, lines 41-47).

Inoue also discloses in Figure 3, “Barrier ribs are arranged parallel to each other in a striped configuration as shown in FIG. 3. More specifically, one end of a barrier rib

located leftmost as seen in FIG. 3 is extended toward one of opposed interior surfaces of a sealing member 32 adjacent to the lower left vent hole 31a, and one end of a barrier rib adjacent to the leftmost barrier rib is extended in a direction opposite to the leftmost barrier rib toward the other interior surface of the sealing member. Each adjacent pair of barrier ribs are arranged in this manner, so that the barrier ribs are arranged in a staggered manner. The number of the barrier ribs is properly selected so that one end of a barrier rib 29 located rightmost as seen in FIG. 3 is extended toward the other interior surface of the sealing member adjacent to the upper right vent hole 31b. The sealing member 32 is made of a known sealer" (column 9, lines 25-39).

Inoue further discloses in Figure 3, "small gaps are present between the extended ends of the respective barrier ribs 29 and the corresponding interior surfaces of the sealing member 32. The gaps each have a gas flow conductance (also referred to as "evacuation conductance") smaller than the gas flow conductance of a space between the sealing member and the other end of the barrier rib. The small gaps may be filled so that the extended ends of the barrier ribs 29 abut against the corresponding interior surfaces of the sealing member 32" (column 9, lines 40-48).

Inoue discloses a gas for cleaning and does not disclose the gas is used for heating, however, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

*Allowable Subject Matter*

5. Claims 2, 28, 30, 76-78 are allowed.
6. The following is an examiner's statement of reasons for allowance: the prior art of record fails to teach or suggest a plasma display panel manufacturing method for providing an improved plasma display panel with cells of phosphor layers including a blue phosphor layer with an improved chromaticity coordinate, the improvement comprising the steps of : forming a sealant layer, about a peripheral region of main surfaces of a front panel and a back panel facing each other to provide cells of phosphor layers, the sealant layer is arranged in contact with both the periphery of the front panel and back panel to provide a plurality of spaced open gaps about the periphery to provide egress to an open space containing the cells between the facing front panel and back panel; circulating a dry gas, wherein a partial pressure of steam included in the dry gas atmosphere is 130 Pa or lower, through the spaced open gaps to remove any absorbed gases from the manufacturing of the front panel and back panel; initially heating the entire facing front panel and back panel to release the absorbed gases while circulating the dry gas through the spaced open gaps; continuing the heating of the entire facing front panel and back panel at a temperature to soften the sealant layer sufficiently to gradually close the spaced open gaps while maintaining the circulation of the dry gas until the peripheral region is sealed wherein the chromaticity coordinate,  $y$ , in the CIE color specification of luminescent color of light emitted from only cells including the blue phosphor layer is 0.08 or lower; and moving the facing front and back panels with the sealant open gaps through an oven

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while directing dry gas through nozzles toward side peripheral regions including the spaced gaps as the spaced gaps are gradually closed by an application of pressure..

The prior art of record teaches the method of manufacturing a plasma display panel however the prior art of record taken alone or in combination fails to teach or suggest a method of manufacturing a plasma display including a step of moving the facing front and back panels with the sealant open gaps through an oven while directing dry gas through nozzles toward side peripheral regions including the spaced gap as the spaced gaps are gradually closed by an application of pressure in order to remove the impurities and improves the light-emitting efficiency and color reproduction of the display panel.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Response to Arguments***

7. Applicant's arguments filed August 6, 2003 have been fully considered but they are not persuasive.

In response to Applicant's argument that Inoue reference fails to teach or suggest a an equivalent peripheral sealing layer with gaps. Examiner asserts Applicant fails to claim a peripheral sealing layer with gaps in claim 54. Examiner asserts that in different embodiments of the Inoue reference teaches a gas circulating unit for directing heating

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gas to the side of the panel, e.g. as shown in Figure 3 of the Inoue reference where the heating gas enters from the bottom left corner and exits the top right corner and along the way the heating gas passes through each side of the panel. Thus Examiner asserts that Inoue reference is valid and maintains the rejection.

Also, in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Kanagu reference and Cho reference both teaches a method of manufacturing a display panel and thus improve the efficiency and desired characteristics of the display panel. Further, Cho teaches "A flat-panel display sealed according to the process of FIG. 2 can be anyone of a number of different types of flat-panel displays such as CRT displays, plasma displays, vacuum fluorescent displays, and liquid-crystal displays. In the flat-panel CRT display example, baseplate structure 40 contains a two-dimensional array of pixels of electron-emissive elements provided over the baseplate. The electron-emissive elements form a field-emission cathode" (column 7, lines 58-65). Thus, Examiner asserts that it would have been obvious to one having ordinary skill in the art at the time the invention was made to have combine the two references in order to improve the efficiency and desired characteristics of the display panel.

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Further, in response to Applicant's argument that the Cho reference teaches away from the features desired in the Kanagu reference. Examiner asserts that Cho does teaches a global heating in the oven combined with the laser heating to improve the sealant procedure of the plasma display device.

Finally in response to Applicant's argument that the Aoki reference fail to address the deficiencies of the prior art of record. Examiner asserts that Aoki reference teaches the claimed blue phosphor and thus it is the intrinsic property of the blue phosphor to exhibit the different claimed characteristics. Thus, Examiner asserts that the prior art of record is valid and maintains the rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (571)272-2370. The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (571)272-2378. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

D.D.  
March 2, 2004



**ALAN CARIASO**  
**PRIMARY EXAMINER**